

APPENDIX A - SAND SPECIFICATION

BEACH FILL

1. PAYMENT

Payment for sand fill shall be made on the basis of the quantity of sand placed within each Acceptance Section, as measured by the volume of sand within the template shown on the plans. The total quantity may be modified depending on the Mean Grain Size of the sand delivered, according to these specifications and the Bid Schedule. During placement and prior to measurement, the fill sand must have been flooded to consolidate the sand, according to these specifications. Acceptance Sections will not be accepted by the Government until all Mean Grain Size analysis and calculations has been completed for that Acceptance Section, verifying the Mean Grain Size of sand delivered, and thus the proper quantity of sand for that Mean Grain Size, as shown on the Bid Schedule.

2. ACCEPTANCE SECTIONS

Acceptance Sections shall be every 500 feet along the project beach.

3. SAND SOURCE

This project is a test fill for a domestic, upland source of sand. No offshore sand sources shall be an acceptable source.

4. SAND FILL MATERIAL

The Contractor is responsible for providing a source, delivery and spreading of beach compatible sand that meet the following specifications. The sand supplied shall be naturally created. The sand may be processed, but manufactured sand is not allowed. Contractor's offering blended sand shall submit a Blending Plan, showing the method the sand components will be thoroughly mixed before final placement on the beach. The project requires the contractor to bid sand with an average mean grain size of 0.30 mm or greater. The sand will be placed and shaped on the beach to fill the construction template shown in the plans, except as modified by the Mean Grain Size. Final beach fill shape shall parallel the construction template shown in the plans.

The project will benefit from placement of coarser sand, and incentive is provided to bid the coarsest sand available.

- 1) The project design beach must be built to the template shown on the plans (52 percent of the total quantity).
- 2) For the advance nourishment portion of the project fill (48 percent of the total quantity), Table 1 shows a reduced quantity incentive for an increased Average Mean Grain Size.

Placed volume reduction for coarser sand is available on the Bid Schedule, up to a maximum allowable Mean Grain Size of 0.55 mm. The contractor should select the

largest (coarsest) Mean Grain Size he can provide. **The contractor is warned that failure to achieve the grain size class selected on the Bid Schedule, by delivering a finer Mean Grain Size sand, will increase the quantity of sand required for delivery to the project.** Correspondingly, a coarser sand delivered than selected on the Bid Schedule will reduce the volume of sand required

**TABLE 1
COARSE SAND INCENTIVES**

MEAN GRAIN SIZE (mm)	DESIGN BEACH		ADVANCE NOURISHMENT		TOTAL QUANTITY CY
	52% OF TOTAL QUANTITY	% Volume Reduction	48% OF TOTAL QUANTITY	% VOLUME REDUCTION	
0.30 – 0.32	312,000	0%	288,000	0%	600,000
0.33 – 0.35	312,000	0%	239,040	17%	551,100
0.36 – 0.39	312,000	0%	210,240	27%	522,240
0.40 – 0.44	312,000	0%	190,080	34%	502,080
0.45 – 0.49	312,000	0%	178,560	38%	490,560
0.50 – 0.55	312,000	0%	172,800	40%	484,800

5. CHARACTER OF MATERIAL

The character of the sand to be supplied by the Contractor shall meet the following physical specifications:

- Composed of quartz and/or carbonate with no more than 20 percent sand of other mineralogical composition.
- The carbonate sand grains allowable under this specification are naturally occurring, durable and solid carbonate grains. Many carbonate grains have excessive internal pore space dramatically reducing the grains density and durability. Carbonate grains delivered under this specification shall be 90 percent durable and solid carbonate grains. Internal pore space shall not exceed 10 percent.

Whole and broken mollusk shells from the beach environment are durable and solid carbonate grains. Due to the platy nature of shells and shell fragments, no more than 60% of the sand (quartz or carbonate) shall be whole or broken shell.

- Silt content (passing #200 sieve (.074mm)) of less than 5%.

- 99% of material must pass 3/8 inch sieve and shall contain no material larger than the 3/4 inch sieve.
- Average mean grain size greater than or equal to 0.30 mm and less than 0.55 mm.
- Phi Standard Deviation values from 0.50 phi to 1.75 phi.
- Free of debris, sharp rocks and pebbles, concrete rubble, clay, and organic material.
- Sand color shall be similar to the existing beach. Based on the Munsell Soil Color Chart, color must be within the range:
 HUE of: 2.5 YR, 5 YR, 7.5 YR, 10 YR, 2.5 Y, 5 Y
 CHROMA of: 1, 2, or 3
 VALUE of: 6, 7, or 8.
 This color specification eliminates strongly colored or dark sand.

6. SUBMITTALS

Sand source information that shall be submitted with the proposal is:

- 1) the name, location and physical address of the proposed sand source;
- 2) written evidence that the proposed sand source is permitted under local, State, and other authorities, as applicable, with a Letter of Commitment from the Sand Source;
- 3) a grain size distribution of the proposed sand source as determined and reported by a Certified Testing Laboratory. The grain size data shall supply all information required for grain size distribution data under GRAIN SIZE REPORTING requirements.
- 4) a 1 to 3 pound sample of the proposed fill material; and
- 5) evidence that the proposed sand source contains sufficient quantity of acceptable material for the construction of the work.

Samples shall be provided in sealed plastic containers, either jars or bags, clearly marked with the name of the Contractor, the name of the source and any other identifying information.

The submitted grain size distribution data and the sample of the proposed sand source (including its color and texture) shall be representative of the typical nature of the entirety of the proposed sand fill. The Government will retain the submitted documents and samples.

7. SAND FLOODING

If the sand is placed in a state that is not completely saturated by hydraulic placement, the Contractor must saturate the dry placed sand to effect consolidation equal to hydraulic

placement. No more than 100 cubic yards of sand at a time shall be placed on the beach without saturating. Enough water must be used to completely saturate the sand, not less than 100 gallons of water shall be available for each cubic yard of sand placement. Run off water shall be controlled so as not to run off the project limits on the upland side and not to run directly to the ocean forming gullies, eroding the fill sand.

8. CALCULATION OF AVERAGE MEAN GRAIN SIZE

The Mean Grain Size and Phi Standard Deviation shall be determined by Method of Moments Statistics calculated from sieve analysis of the proposed sand source. A Certified Testing Laboratory shall perform laboratory testing in accordance with ASTM – D422. The Method of Moments Statistics shall be calculated according to the instructions contained within this section.

Mean grain size and phi standard deviation are statistical measures of the textural character of a sample of sand, corresponding to the mean and standard deviation of a statistically normal population (example: sand grain sizes). Laboratory sieving of sand provides the data for calculation of the mean grain size and phi standard deviation. There are several methods of calculating these statistics. For the purposes of this contract, Mean Grain Size and Phi Standard Deviation shall be calculated by the Method of Moments. The method of calculation is included in this section. The Average Mean Grain Size refers to the average of the Mean Grain Sizes calculated for individual samples sieved in the laboratory. The Average Mean Grain Size shall be used to evaluate price and quantity incentives for this contract.

9. GRAIN SIZE REPORTING

The grain size distribution information shall be based upon ASTM – D422, using U.S. Standard sieve sizes 3/8", 4, 8, 16, 30, 40, 50, 70, 100, 140, 200, 230. Each sample test results shall be represented by a gradation curve and a frequency curve. All gradation curves shall be submitted on ENG Form 2087, sample appended to this section. All title information shall be filled out with project name, date, sample number, location sample obtained, unified soil classification, percent silt passing the No. 200 sieve (0.074mm), percent silt passing the No. 230 sieve (0.063mm) and Method of Moments Mean Grain Size and Phi Standard Deviation. Each curve shall state what Mean Grain Size class the sample meets, according to the Bid Schedule. Frequency curves shall show percent retained on vertical axis and grain size on horizontal axis. Frequency curves shall be identified by sample number and date and accompany the gradation curve. A tabulation of the laboratory results of weight retained, percent retained and cumulative percent retained on each sieve, by weight, shall be provided with each gradation curve. Samples from the sand source shall be numbered consecutively. Samples from the project site shall be identified with the Acceptance Section, numbered consecutively for each Acceptance section, and a station and range location.

10. CERTIFIED TESTING LABORATORY

Certified Testing Laboratory refers to a geotechnical testing laboratory qualified under ASTM E329-95c standards and certified by AASHTO (American Association of State Highway and Transportation Officials) National Voluntary Accreditation Program; or MMRL (AASHTO Materials Reference Laboratory accreditation; and personnel qualified by NICET (National Institute for Certification of Engineering Technicians).

11. MEAN GRAIN SIZE AND PHI STANDARD DEVIATION CALCULATION USING THE MOMENT METHOD

The equations for calculating the Mean Grain Size and Phi Standard Deviation using the moment method are as follows:

$$\text{Mean Grain Size } M = \frac{\sum fx}{n}$$

$$\text{Phi Standard Deviation } \sigma = \sqrt{\frac{\sum (x - M)^2}{n}}$$

Use of these equations to calculate the moment method values is illustrated in Table 2. Column A is the sieve size used, Column B is the corresponding sieve opening in millimeters, and Column C is the sieve opening in phi. The phi values are used in the calculation.

Sieve analysis measures the percent retained on each sieve size by weight (Column D). Column E (x) is the midpoint value in phi between adjacent sieves. Column F (f) is the percent retained by the smaller of adjacent sieves. Column G is the product of Column E and F (x * f). The sum of the values in Column F is n, sum of the percent retained on the smallest sieve used. This value will generally be less than 100%, as some fine material passes through all the screens. The sum of the values in Column G is $\sum fx$, and its division by n produces the mean grain size in phi units of measure. The millimeter (mm) value is calculated as follows:

$$2^{-\text{phi}} = \text{mm}$$

$$\text{Example: } 2^{-1.25 \text{ phi}} = 0.42 \text{ mm}$$

Columns H and J are used to calculate the Phi Standard Deviation (σ) value of the material. If a sieve size is not used in the testing process it should be completely eliminated from the calculation table.

12. QUALITY CONTROL SAMPLING

The Contractor shall perform sampling that includes no less sample collection than described in the following plan. The Contractor shall conduct all testing in a location accessible to government inspectors. The Contractor shall include the sampling and testing procedure in his Contractor's Quality Control Plan for government review and acceptance within ten days of notification of acceptance of Bid. The Quality Control Plan shall include the name, address and point of contact for the Certified Testing Laboratory to be used for all grain size analysis. The location of the testing facility to be

Table 2								
CALCULATION OF MOMENT METHOD FOR MEAN GRAIN SIZE AND PHI STANDARD DEVIATION								
A	B	C	D	E	F	G	H	I
U.S. STANDARD SIEVE	GRAIN SIZE		CUMULATIVE PERCENT RETAINED*	* Cumulative Percent Retained is example results of laboratory sieving of a sand sample.				
	mm	PHI		x	f	fx	(x-M) ²	f(x-M) ²
3/4	19.00	-4.25	0.0%					
				-3.75	0.9%	-0.034	28.084	0.253
3/8	9.51	-3.25	0.9%					
				-2.75	3.8%	-0.105	18.498	0.703
4	4.76	-2.25	4.7%					
				-1.75	4.7%	-0.082	10.901	0.512
8	2.38	-1.25	9.4%					
				-0.75	9.5%	-0.071	5.298	0.503
16	1.19	-0.25	18.9%					
				0.25	10.5%	0.026	1.694	0.178
30	0.595	0.75	29.4%					
				1.00	4.5%	0.045	0.303	0.014
40	0.420	1.25	33.9%					
				1.50	5.3%	0.080	0.002	0.000
50	0.297	1.75	39.2%					
				2.00	9.0%	0.180	0.203	0.018
70	0.210	2.25	48.2%					
				2.50	12.3%	0.307	0.899	0.111
100	0.149	2.75	60.5%					
				3.00	24.8%	0.744	2.098	0.520
140	0.105	3.25	85.3%					
				3.50	10.6%	0.371	3.815	0.404
200	0.074	3.76	95.9%					
				3.88	1.1%	0.043	5.417	0.060
230	0.063	4.00	97.0%					
SUM				n=	97.0%			
SUM				Σ=		1.50		3.276
MEAN GRAIN SIZE (PHI)				M(phi) =		1.55		
MEAN GRAIN SIZE (mm)				M(mm) =		0.34		
PHI STANDARD DEVIATION				σ=				1.84

used for this contract shall also be included in the Quality Control Plan. Gradation test results shall be turned in daily with the daily quality control reports. Each sample collected shall be approximately one pound in weight and obtained from a single location. **All laboratory test results shall be reported to the Government.**

Sampling at the Sand Source

Sand samples for laboratory testing shall be collected at the sand source at the rate of one sample for every 2000 cubic yards of sand to be transported. Sampling and testing shall be completed before the sand is transported to the project site, and shall be representative of the sand being delivered to the project. Each day's samples Mean Grain Size and Phi Standard Deviation shall be averaged and the running average recorded on the gradation curve, along with the individual sample Mean Grain Size and Phi Standard Deviation. A new average shall be started each day. The Average Daily Mean Grain Size shall be used as an indicator for the Mean Grain Size for the sand proposed on the Bid Schedule and being delivered to the project. No individual sample Mean Grain Size shall be less than 0.25 mm. Any materials not meeting the Mean Grain Size requirements shall not be transported to the project site. Any materials not meeting the Contractor's Bid Mean Grain Size delivered to the project site shall fall into the lower Mean Grain Size class, and appropriately more sand shall be delivered.

Sampling at the Project Site

Sand samples for laboratory testing shall be collected at the project site. Sand samples shall represent the fill material only, avoiding existing beach sand below the project fill. Sand samples shall be collected from each beach fill Acceptance Section. Sand samples shall be collected at the rate of one sample representing 500 cubic yards of sand delivered. This represents approximately 100 samples taken per 500 foot Acceptance Section. The samples shall be collected on a regular sampling grid covering the entire Acceptance Section, and the location recorded on the gradation curve. The plan of beach sampling shall be submitted with the Contractor's Quality Control Plan. All sample collection in an Acceptance Section shall be distributed temporally over the entire filling operation. Half of the samples shall be collected during filling of the Acceptance Section, when the fill is approximately less than half of the final grade. The second half of the samples shall be taken from the surface of the completed Acceptance Section. Samples shall not be collected from the surface, but 6 inches below the ground surface. Before an Acceptance Section is surveyed for final payment and accepted by the government, all sample laboratory analyses shall be completed and submitted to the Government. All individual sample Mean Grain Size and Phi Standard Deviation shall be tabulated. The tabulation shall include sample identifying information including Acceptance Section, sample number and date. The Average Mean Grain Size and Average Phi Standard Deviation for each Acceptance Section shall be calculated from and indicated on the tabulation sheet. The Average Mean Grain Size from the sample analysis for each Acceptance Section shall be compared to the Bid Schedule Mean Grain Size class, and verify that the appropriate quantity of sand has been delivered for the

Mean Grain Size of the sand in that Acceptance Section. The survey of the Acceptance Section will verify the quantity of sand delivered. **The total quantity of sand in an Acceptance Section shall match the quantity shown on the Bid Schedule for the Mean Grain Size class of sand indicated by the Average Mean Grain Size of sand delivered to that Acceptance Section.**

13. PERMITS

The Contractor shall be responsible for obtaining all applicable permits for the sand source. As part of the proposal, the contractor shall submit evidence satisfactory to the Government that the sand source to be used for the project is permitted by local, State, and Federal authorities, as applicable. The Contractor is likewise responsible for obtaining all applicable permits and licenses for the transport of equipment and material undertaken as part of the work.

The Government shall obtain permits for the placement of the fill sand along the project beach area. By acceptance of the contract, the Contractor agrees to abide by all applicable conditions of the permits.

14. ENVIRONMENTAL QUALIFICATIONS AND ENVIRONMENTAL SAMPLING

GENERAL INFORMATION

It is important that any material to be used for a Dade Co. sand borrow source be considered to be as clean as what exists on Dade beaches or is normally used for playground quality sand. A Phase I HTRW (Hazardous Toxic and Radioactive Waste) Evaluation to meet the requirements of ASTM E-1527-97 shall be performed on the borrow source material. If the borrow site contains HTRW materials or is suspected of containing hazardous materials, fissionable materials, environmental contaminants or otherwise toxic materials it shall not be used as a borrow source. After the Notice to Proceed is issued, the Contractor shall submit an Environmental Sampling Plan, which will include the Phase 1 HTRW report. Approval of the Plan will not relieve the Contractor of his responsibility to document all potential sources of contamination of the borrow material, preexisting conditions in and around the borrow site, and to avoid contaminating any portion of the beach placement area with substandard material. Although an Environmental Sampling Plan needs to be submitted, actual environmental sampling may not be necessary. The Government will make the determination on the need for the Contractor to conduct environmental sampling and analysis at any point in time during the project, based on the information that is provided, and inspections of the borrow area and beach for the duration of the project.

The sand fill material shall not contain radioactive content, total recoverable petroleum hydrocarbons (TRPH), heavy metals (As, Ba, Cd, Cr, Hg, Pb, Se), volatile halogenated organics, polycyclic aromatic hydrocarbons, or other contaminants at levels in excess of those measured within the natural occurring beach sediments of the work area. The Contractor shall be responsible for obtaining all applicable permits and licenses for the extraction, transport, and placement of the sand fill material.

If environmental sampling is determined to be necessary by the Government, Contractor will be directed to conduct sampling and provide laboratory results on all criteria determined to be necessary. The laboratory results/report (environmental sampling report) will be provided within 2 weeks after the Government approves the plan and notifies the Contractor to conduct the sampling. The report shall include, but not be limited to, sample locations with coordinates, project drawings with the sample locations, dates and times of sampling, criteria that was tested for along with the method detection limits for each criteria, summary statement of the test results, etc. An adequate amount of the samples shall be collected and saved, in case additional analyses are needed.

The Environmental Sampling Plan shall be in accordance with, but not be limited to, the following:

- a. Phase 1 HTRW Report.
- b. Project drawings of the borrow area with proposed sampling locations shown on the drawings.
- c. Information on the certified laboratory or laboratories (names, addresses, and phone numbers, points of contact, etc) that would be utilized to conduct the testing/analysis.
- d. Methodologies and procedures for sampling and laboratory analysis.

GENERAL REQUIREMENTS FOR BORROW SOURCES:

As stated above, it is important that any material to be used for Dade County sand borrow source be considered to be as clean as what exists on Dade County beaches. A Phase I Hazardous Toxic and Radioactive Waste (HTRW) Evaluation to meet the requirements of ASTM E 1527 **shall be performed** by the Contractor on the borrow source material. If the borrow site contains HTRW materials or is suspected of containing hazardous materials, fissionable materials, environmental contaminants or otherwise toxic materials it shall not be used as a borrow source. Materials passing these evaluation criteria will be tested as provided below, if deemed necessary by the Government based on inspections of the borrow site material and beach for the duration of the project.

REQUIREMENTS FOR RADIOACTIVE ISOTOPES:

Testing for radioactive isotope is only necessary if the source of material is from non-silicate sands, phosphate mine tailings or from other suspected source(s), which potentially have unacceptable radiation levels. Testing radiation levels and radioactivity content shall be measured for the borrow material and for beach area. The borrow area and the beach placement area shall be surveyed in a pattern approved by the Government as described below. The background radioactivity and radiation levels (milli-roentgens/hour) of the borrow area vs. the beach site shall be compared. The levels of contaminant (radioactivity content in pico-curies/gram) in borrow material cannot exceed the mean levels existing at the beach placement area. If radioactivity levels of the source material exceed the mean naturally occurring radiation levels at the beach area, the site shall not be used as a borrow source. These radiological surveys and analysis shall consist of the following:

- (1) Radiation surveys are to be taken at the beach and borrow sites. The radiation levels shall be presented in graphical and tabular form. These surveys shall be taken at waist level. Additionally, samples from the beach and borrow site shall be analyzed for radioactivity levels and be reported in pico-curies per gram. The measurements shall also fall within 1 standard deviation or suspect high values will be determined to be the most conservative representation of the results. The results of the radioactivity (pico-curies per gram) shall be reported in graphic and tabular form.
- (2) The resulting beach background radiation level shall not be increased by more than 20 micro-roentgens/hour. This is to be determined by gamma radiation surveys (with the probe at waist level) taken both before and after the beach material placement.
- (3) Gamma spectroscopy analysis for Radium 236 shall be performed at the beach site and at the potential borrow site. The placement of borrow material shall not allow the resulting composite radioactivity at the beach (determined by the gamma spectroscopy) to increase by more than 5 pico-curies/gram.
- (4) Methodology for radioactivity content to be used for individual sample analysis shall be EPA Method 9310 for alpha and beta emissions.
- (5) Methodology for gamma spectroscopy analysis shall be submitted by the Contractor and approved by the Contracting Officer.
- (6) The Contractor shall provide reports to the CO/COR demonstrating their evaluation of the above criteria and provide all data including all radiation values taken.

REQUIREMENTS FOR ENVIRONMENTAL CONTAMINANTS:

If deemed necessary by the Government based on reviews of the information submitted and inspections of the borrow material and beach for the duration of the project, the Contractor shall provide reports to the Government demonstrating their evaluation of the below criteria and provide all data including all chemical values determined. The data shall be provided in graphical and tabular format. It is anticipated that background level of contaminants for Dade County beaches is essentially zero or below detection limits.

Should contaminants be detected in borrow material the levels of contaminant in borrow material cannot exceed the mean levels existing at the beach placement area in samples taken as described below. These measurements will consist of the following chemical testing of the borrow material and elutriates:

- (1) Total Recoverable Petroleum Hydrocarbons (TRPH), EPA 9071A or EPA 8440
- (2) Heavy metals (As, Ba, Cd, Cr, Hg, Pb, Se), EPA Method 3051 (Use graphite furnace method for each metal except Hg which has own method)
- (3) Volatile Halogenated Organics (Cl-, Br-), EPA Method 8021A
- (4) Polycyclic Aromatic Hydrocarbons (BTEX), EPA Method 8021A
- (5) Elutriate Preparation shall be by the method provided in EPA/CE 81-1. Testing for all above contaminants shall be performed on elutriates.

If contaminant levels of the borrow material exceed the mean naturally occurring contaminant levels at the beach area, the site shall not be used as a borrow source. The measurements shall also fall within 2 standard deviation or suspect high values will be determined to be the most conservative representation of the results. Elutriate values shall be compared to State water quality standards to determine whether runoff will violate State standards.

SAMPLING LOCATIONS FOR ENVIRONMENTAL CONTAMINANTS:

Samples to be taken for the above requirements shall be taken every 1,000 feet as needed in the beach placement area, for representative beach quality samples, and in spots considered to be representative of every 50,000 cubic yards of the borrow material at the borrow site. Representative samples from all sites shall be taken in a pattern and locations approved by the Contracting Officer.

APPENDIX B - SECTION 404(B) EVALUATION

SECTION 404(b) EVALUATION

PROPOSED TEST FILL AT MIAMI BEACH USING A DOMESTIC UPLAND SAND SOURCE DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT MIAMI-DADE COUNTY, FLORIDA

I. Project Description

a. Location. The project is located on the southeast Florida coast within Miami-Dade County. The proposed location for the test fill is in Miami Beach between DNR monuments R-36 and R-47. The proposed work will be performed as a part of the Dade County Beach Erosion Control and Hurricane Protection Project. Refer to Location Map, Figure 1, in the Environmental Assessment (EA).

b. General Description. The proposed action consists of constructing a 205-foot wide berm along approximately 1.5 miles of shoreline using domestic upland sand as the source of beach fill.

c. Authority and Purpose. Initial authorization came from the Flood Control Act of 1968 authorization of the Beach Erosion Control and Hurricane Protection (BEC & HP) Project for Dade County, Florida (see Figure 1, Location Map). In addition, Section 69 of the 1974 Water Resources Act (P.L. 93-251 dated 7 March 1974) included the initial construction by non-Federal interests of the 0.85-mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet. The authorized project, as described in HD 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park. The Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986 (Public Law 99-662) provided authority for extending the northern limit of the authorized project to include the construction of a protective beach along the 2.5 mile reach of shoreline north of Haulover Beach Park (Sunny Isles) and for periodic nourishment of the new beach. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the authorized 1968 BEC & HP Project for Dade County, which covered 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park, from 10 years to the 50-year life of the project.

Nourishment of Miami-Dade County Beaches has become a necessity to provide storm protection. The purpose of the project is to prevent or reduce loss of public beach front to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material.

Material suitable for beach placement must meet the following specifications:

- Composed of quartz and/or carbonate with no more than 20 percent other constituents.
- Average mean grain size greater than or equal to 0.30 mm and less than 0.55 mm.
- Silt content (passing #200 sieve (.074mm)) of less than 5 percent.
- 99 percent of the material must pass 3/8 inch sieve and sand shall contain no material larger than the 3/4 inch sieve.
- Phi Standard Deviation values from 0.50 phi to 2.00 phi.
- Free of debris, sharp rocks and pebbles, concrete rubble, clay and organic material.
- Sand color will be similar to the existing beach. Based on the Munsell Soil Color Chart, color must be within the following range: HUE of 2.5 YR, 5 YR, 7.5 YR, 10 YR, 2.5 Y, 5 Y with a CHROMA of 1, 2, or 3 and a VALUE of 6, 7, or 8. This color specification eliminates strongly colored or dark sand.

(2) Quantity of Material. The quantity of material needed to construct the 1.5-mile length of beach is estimated at 600,000 cubic yards.

(3) Source of Material. The exact source of the upland sand for the test beach would be determined during the procurement process. Sand sources proposed by contractors would have to meet a set of generic sand specifications and pass a screening process for sand characteristics and potential environmental impacts. The sand specification that will be used can be found in Appendix A of the EA

e. Description of the Proposed Construction Site.

(1) Location. The proposed beach fill would be placed along the Atlantic shoreline in northern Miami Beach between DEP monuments R-36 and R-47 (EA Figures 2 and 3).

(2) Size. The proposed fill would be approximately 1.5 miles in length with a berm width of 205 feet measured from the erosion control line (ECL).

(3) Type of Site. The site for disposal of the sand material is a segment of eroded, sandy, recreational beach and inshore seabed.

(4) Type of Habitat. The beach disposal area consists of a currently eroding carbonate and quartz sand beach and inshore seabed.

(5) Timing and Duration of Dredging. The exact timing of nourishment is not known. It is anticipated that construction will occur during 2002 or 2003.

f. Description of Disposal Method. It is anticipated that the material would be transported by ocean going vessel (dredge, barge, etc.) to a pumpout facility located offshore of the beach fill area. The material would then be pumped onto the beach and graded using construction equipment to achieve the desired construction profile.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. The beach fill would be constructed with a berm elevation of +9.0 feet mean low water and a width of 205 feet from the ECL. The construction slope of the beach fill would be 1 vertical on 15 horizontal (EA Figures 2 and 3).

(2) Type of Fill Material. The material to be used as beach fill will be a quartz and/or carbonate sand from an upland sand source that meets the requirements of the sand specification (EA Appendix A).

(3) Dredge/Fill Material Movement. The fill material will be subject to erosion by waves with the net movement of fill material to the south.

(4) Physical Effects on Benthos. Some benthic organisms that are not mobile may be covered by the beach fill. Recolonization soon after project completion is expected to replace those organisms that do not survive project construction. It is anticipated that no long-term adverse impacts will occur.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column Effects. During beach fill operations turbidity will increase temporarily in the water column adjacent to the project shoreline. The increased turbidity will be short-

term; therefore fill placement will have no long-term or significant impacts, if any, on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication.

(2) Current Patterns and Circulation. Net movement of water is from the north to the south. The project will have no significant effect on existing current patterns, current flow, velocity, stratification, or the hydrologic regime in the area.

(3) Normal Water Level Fluctuations and Salinity Gradients. Mean tidal range in the project area is 3.5 feet with a spring tide range of approximately 4.1 feet. Salinity is that of oceanic water. Fill placement will not affect normal tide fluctuations or salinity.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. There may be a temporary increase in turbidity levels in the project area along the beach fill site during discharge. Turbidity will be short-term and localized and no significant adverse impacts are expected. State water quality standards for turbidity outside an allowable mixing zone would not be exceeded.

(2) Effects on the Chemical and Physical Properties of the Water Column. The sea floor, at this location, is characterized by a sandy beach and inshore seabed. There would be little, if any adverse effects to chemical and physical properties of the water as a result of placing clean beach compatible sand on the beach.

(a) Light Penetration. Some decrease in light penetration may occur in the immediate vicinity of the beach fill area. This effect will be temporary, limited to the immediate area of construction, and will have no adverse impact on the environment.

(b) Dissolved Oxygen. Dissolved oxygen levels will not be altered by this project due to the high energy wave environment and associated adequate reaeration rates.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens are expected to be released by the project.

(d) Aesthetics. The aesthetic quality of the water in the immediate area of the project will be reduced during construction due to increased turbidity. This will be a short-term and localized condition. The placement of clean beach compatible sand on an erosive beach will likely improve the aesthetic quality of the immediate area.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. Primary productivity is not a recognized, significant phenomenon in the surf zone, where a temporarily increased level of suspended particulates will occur. There will be no effect on the nearshore productivity as a result of the proposed beach fill.

(b) Suspension/Filter Feeders. An increase in turbidity could adversely impact burrowing invertebrate filter feeders within and adjacent to the immediate construction area. It is not expected that a short-term, temporary increase in turbidity will have any long-term negative impact on these highly fecund organisms.

(c) Sight Feeders. No significant impacts on these organisms are expected as the majority of sight feeders are highly motile and can move outside the project area.

d. Contaminant Determinations. The upland sand that will be used as beach fill material will not introduce, relocate, or increase contaminants at the fill area. The material would be clean sand meeting the sand specification (EA Appendix A) and compatible with the existing beach.

e. Aquatic Ecosystem and Organism Determinations. The upland sand that will be placed on the beach is similar enough to the existing substrate so that no impacts are expected. The materials meet the exclusion criteria, therefore, no additional chemical-biological interactive testing will be required.

(1) Effects on Plankton. No adverse impacts on autotrophic or heterotrophic organisms are anticipated.

(2) Effects on Benthos. The beach fill will bury some benthic organisms. Benthic organisms found in the intertidal areas along the project beach are adapted for existence in an area with considerable substrate movement, thus most will be able to burrow up through the fill material. Recolonization is expected to occur within a year after construction activities cease. No adverse long-term impacts to non-motile or motile benthic invertebrates are anticipated. Placement of the discharge pipeline across the nearshore hardbottom will impact a portion of the benthic community. Any impact to the hardbottom community as a result of placing the pipeline will be mitigated as discussed in Section 4.4.1 in the EA.

(3) Effects on Nekton. No adverse impacts to nektonic species are anticipated.

(4) Effects on the Aquatic Food Web. No adverse long-term impact to any trophic group in the food web is anticipated.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. There are no hardground or coral reef communities located in the immediate nearshore area that would be impacted by beach fill activities. A discharge pipeline used to pump the sand to the beach will be placed across the nearshore hardbottom habitat (EA figure 2). Any impacts to the hardbottom community would be appropriately mitigated by constructing an artificial reef. Section 4.4.1 in the EA offers a more detailed discussion on hardbottom impacts and mitigation.

(6) Endangered and Threatened Species. There will be no significant adverse impacts on any threatened or endangered species or on critical habitat of any threatened or endangered species. Section 4.3 in the EA discusses measures that will be implemented to protect endangered and threatened species.

(7) Other Wildlife. No adverse impacts to small foraging mammals, reptiles, or wading birds, or wildlife in general are expected.

(8) Actions to Minimize Impacts. All practical safeguards will be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area. Specific precautions are discussed elsewhere in this 404(b) evaluation and in the EA for this project (refer to Sections 4.0 and 5.0 in the EA).

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. Clean sand, compatible with the existing beach, would be placed on the beach. This will not cause unacceptable changes in the mixing zone water quality requirements as specified by the State of Florida's Water Quality Certification permit procedures. No adverse impacts related to depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents are expected from implementation of the project.

(2) Determination of Compliance with Applicable Water Quality Standards. Because of the inert nature of the material to be used as beach fill, Class III water quality standards will not be violated.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. No municipal or private water supplies will be impacted by the implementation of the project.

(b) Recreational and Commercial Fisheries. Fishing in the immediate construction area will be prohibited during construction. Otherwise, recreational and commercial fisheries will not be impacted by the implementation of the project.

(c) Water Related Recreation. Beach/water related recreation in the immediate vicinity of construction will be prohibited during construction activities. This will be a short-term impact.

(d) Aesthetics. The existing environmental setting will not be adversely impacted. Construction activities will cause a temporary increase in noise and air pollution caused by equipment as well as some temporary increase in turbidity. These impacts are not expected to adversely affect the aesthetic resources over the long term and once construction ends, conditions will return to pre-project levels.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. No such designated sites are located within the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. There will be no cumulative impacts that result in a major impairment in water quality of the existing aquatic ecosystem resulting from the placement of fill at the project site.

h. Determination of Secondary Effects on the Aquatic Ecosystem. There will be no secondary impacts on the aquatic ecosystem as a result of the dredging.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States. Further, no less environmentally damaging practical alternatives to the proposed actions exist. To test the suitability of upland sand sources, the borrow areas proposed by the contractor will be used for this project. In addition, the impacts of using other sources on cultural resources, protected species, and other environmental factors would likely be equal to or greater than the impacts of the proposed action. The no action alternative would allow the present condition of the shoreline to continue and would not provide the benefits needed for storm damage protection.

c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The disposal of fill material for beach renourishment will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended. Standard conditions for monitoring and relocating turtle nests would be employed

e. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. Appropriate steps have been taken to minimize the adverse environmental impact of the proposed action. The material proposed as beach fill has low silt content, therefore, turbidity due to silt will be low when discharging. Turbidity will be monitored so that if levels exceed State water quality standards of 29 NTU's above background, the contractor will be required to cease work until conditions return to

normal. In the vicinity of reef and other hard grounds, measures would be taken to minimize sediment deposition on sensitive reef organisms.

g. On the basis of the guidelines, the proposed dredging and disposal sites are specified as complying with the requirements of these guidelines.

APPENDIX C - COASTAL ZONE MANAGEMENT CONSISTENCY

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM FEDERAL CONSISTENCY EVALUATION PROCEDURES

PROPOSED TEST FILL AT MIAMI BEACH USING A DOMESTIC UPLAND SAND SOURCE DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT MIAMI-DADE COUNTY, FLORIDA

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information have been submitted to the state in compliance with this chapter.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan, which sets goals that articulate a strategic vision of the State's future. It's purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed action involves placing beach compatible material from an upland sand source onto an eroding beach as a protective means for residents, development and infrastructure located along the Atlantic shoreline within the community of Miami Beach in Miami-Dade County. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed beach renourishment would create increased recreational beach and potential sea turtle nesting habitat. No seagrass beds or hardgrounds are located within the area proposed to receive fill. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Since the affected property already is in public ownership, this chapter does not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project area does not contain any state parks or aquatic preserves. The project is consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). Historic Property investigations were conducted in the project area. No known historic properties are located on the segment of beach to be renourished. The SHPO concurred with the Corps determination that the proposed project will not adversely affect any significant cultural or historic resources. The project will be consistent with the goals of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed beach nourishment would protect the beach. The larger beach, as a result of this project, will attract tourists by providing additional space for recreation and more protection to recreational facilities along the beach. This would be

compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Public Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed beach fill may cause a temporary short-term impact to infaunal invertebrates from increased turbidity and/or direct burial of these organisms. However, these organisms are highly adapted to the periodic burial by sand in the intertidal zone. These organisms are highly fecund and are expected to return to pre-construction levels within 6 months to one year after construction. No adverse impacts to marine fishery resources are expected. It is not expected that sea turtles would be significantly impacted by this project. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Florida Fish and Wildlife Conservation Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions, which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project will have no effect on freshwater aquatic life or wild animal life.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the

contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development.

Response: The proposed renourishment project will not have any regional impact on resources in the area. Therefore, the project is consistent with the goals of this chapter.

16. Chapter 388, Arthropod Control. This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: A Draft Environmental Assessment addressing project impacts has been prepared and will be coordinated with the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. Water Quality Certification will be sought from the State prior to construction. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.